

CLAIMS

What is claimed is:

1. An analytical detection element, said detection element comprising

a first region comprising a molecularly permeable solid and adsorbed on said solid a radiant energy-detectable material or a material capable of producing a radiant energy-detectable material, wherein said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material is displaceable by a target analyte; and

a second region for sequestering radiant energy-detectable material displaced from or produced by material displaced from said molecularly permeable solid prior to detection of said radiant energy-detectable material.

2. The analytical detection element of claim 1 wherein said molecularly permeable solid is selected from the group consisting of activated carbon, silica, alumina, ion exchange resin, molecular sieve and particulate organic polymeric adsorbent.

3. The analytical detection element of claim 1 wherein said detection element is multi-layered and said first region and said second region are in separate layers in said detection element.

4. The analytical detection element of claim 1 wherein said detection element is a single layer.

5. The analytical detection element of claim 1 wherein said detection element is in a single layer that can be applied to a surface as a coating material.

5 6. The analytical detection element of claim 1 wherein said detection element is in multiple small pieces.

7. The analytical detection element of claim 1 further comprising a background region against which radiant energy-
10 detectable material can be detected.

8. The analytical detection element of claim 1 wherein a material capable of producing a radiant energy-detectable material is adsorbed on said solid and said material capable of producing a
15 radiant energy-detectable material is capable of initiating a chemical reaction or physical process that results in a change in a radiant energy-detectable material residing in said second region.

20 9. A multi-layer analytical detection element comprising
a transparent base layer;
a concentrating or mordanting layer coated on said base layer;
an opacifying or reflecting layer coated on said
25 concentrating or mordanting layer; and
a sample capture layer coated on said opacifying or reflecting layer, said sample capture layer comprising a molecularly permeable solid and adsorbed on said solid a radiant energy-detectable material or a material capable of producing a
30 radiant energy-detectable material, wherein said radiant energy-

0350466-070999

detectable material or said material capable of producing a radiant energy-detectable material is displaceable by a target analyte.

5 10. An analyte detection badge comprising the multi-layer analytical detection element of claim 9.

11. An analyte detection badge comprising the analytical detection element of claim 1.

10

12. A container for detecting an analyte in the vapor phase, said container comprising

a sealable container body in which can be placed a liquid or solid to be analyzed for the presence of a volatile analyte;

15

a container cap with which said container body can be sealed; and

the multi-layer analytical detection element of claim 9, wherein said detection element is positioned on an interior surface of one of said container body or said container cap.

20

13. A container for detecting an analyte in the vapor phase, said container comprising

a sealable container body in which can be placed a liquid or solid to be analyzed for the presence of a volatile analyte;

25

a container cap with which said container body can be sealed; and

the analytical detection element of claim 1, wherein said detection element is positioned on an interior surface of one of said container body or said container cap.

30

09350456-070999

14. A coating material comprising the analytical detection element of claim 1.

15. A method for detection of an analyte, said method comprising
5 the steps of:

10 providing an analytical detection element, said detection element comprising a molecularly permeable solid and adsorbed on said solid a radiant energy-detectable material or a material capable of producing a radiant energy-detectable material, wherein
10 said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material is displaceable by a target analyte;

15 exposing said analytical detection element to a population of molecules possibly containing said target analyte for a period of time sufficient to permit displacement by said target analyte
15 of said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material from said molecularly permeable solid;

20 determining the amount of said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material displaced from said molecularly permeable solid; and

25 correlating the amount of said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material displaced from said molecularly permeable solid with the amount of target analyte present in said population of molecules.

16. The method of claim 15 wherein, in said providing step, said
30 molecularly permeable solid in said analytical detection element

is selected from the group consisting of activated carbon, silica, alumina, ion exchange resin and molecular sieve.

17. The method of claim 15 wherein, in said providing step, said analytical detection element is multi-layered and said first region and said second region are in separate layers in said detection element.

18. The method of claim 15 wherein, in said providing step, said analytical detection element further comprises a background region against which radiant energy-detectable material can be detected.

19. The method of claim 15 wherein, in said analytical detection element in said providing step, a material capable of producing a radiant energy-detectable material is adsorbed on said solid and said material capable of producing a radiant energy-detectable material is capable of initiating a chemical reaction or physical process that results in a change in a radiant energy-detectable material residing in said second region.

20. The method of claim 15 wherein, in said exposing step, said radiant energy-detectable material or said material capable of producing a radiant energy-detectable material displaced by said target analyte is made mobile by the presence of a high boiling plasticizer solvent.